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Clinicopathological and immunohistochemical study of mucinous carcinoma of breast

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Abstract

Introduction: Mucinous carcinoma (also known as colloid carcinoma) is a particular type of breast cancer characterized by the presence of extracellular mucin and is linked with a more favorable prognosis than invasive breast carcinoma of no special type. Mucinous carcinoma of the breast is an uncommon form of breast tumor, often presenting as a lobulated, moderately well circumscribed mass on mammography, sonography, and MRI imaging. It accounts for 1 to 7% of all breast cancers. Pure mucinous breast carcinomas are rare and account for about 2% of all primary breast carcinomas. Metastatic disease happens at a lower rate than in other types of invasive carcinoma.

Aims and Objectives: To study the Clinicopathological and Immunohistochemical features of Mucinous Carcinoma Breast.

Materials and Methods: We present our 2 year study from January 2016 to December 2018 in the Dept of Pathology, Guntur Medical College, Guntur on mucinous carcinoma of breast. Patients diagnosed with Pure MC and Mixed MC according to WHO classifications of tumors of breast 2012 were studied. Specimens were routinely processed and stained with Hematoxylin and eosin.

Results: We identified 25 patients with mixed and pure mucinous breast cancer, the tumor size varied greatly from 2 to 19 cm in diameter. A subset of mixed mucinous carcinomas (8 cases) showed neuroendocrine differentiation or other associated premalignant lesions.

Conclusion: Mucinous carcinoma of the breast is a rare entity with a favourable prognosis. In our study pure mucinous carcinoma accounted largest group and are seen at a younger age when compared to mixed mucinous carcinoma. Almost all the cases presented in stage p T2. Majority of the Pure MC did not show evidence of secondary deposit, whereas 50% cases of Mixed MC show secondary deposit. Most of cases of pure mucinous and mixed mucinous showed hormone receptor positivity. Older age at presentation, lesser tumor size and stage, hormonal receptor positivity are observed in our study, all of which are associated with good prognosis.

Keywords: Mucinous, pure, mixed carcinoma, breast carcinoma

Introduction

Breast cancer is the second leading cause of death in Indian women. It has different histologic types that reflect not only histologic features but also clinical and biological aspects.

Mucinous breast carcinoma is a rare type of breast cancer, presenting with a large amount of extracellular mucin^[1]. It is divided into 2 main subtypes, the pure type and the mixed type^[3]. The distinction between these subtypes is based upon the quantification of cellularity. The mucoid component varies between 30% to over 90% of the tumor

An explicit percentage necessary to diagnose mucinous carcinoma is currently not clearly settled. Most pathologists agree that a diagnosis of pure mucinous breast carcinoma should be reserved for tumors with at least 90% mucinous component. The pure type consists almost exclusively of tumor tissue with extracellular mucin production, while the mixed subtype also contains an invasive ductal epithelial component without mucin^[2]. Pure mucinous breast carcinoma is an uncommon histologic type of mammary tumor, representing 2% of all breast malignant neoplasms. It has a better prognosis than invasive breast carcinoma of no special type. Some mucinous breast carcinomas (mainly mixed type) are associated with lobular or ductal neoplasia (in situ or invasive) and some have neuroendocrine differentiation.

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Material and Methods

A two year period retrospective study from January 2016 – December 2018 in the Department of Pathology, Guntur Medical College, Guntur. Retrospective review of our own data base of patients diagnosed with breast carcinoma were reviewed and the demographical data and clinopathological data of Mucinous carcinoma of Breast were analysed according to WHO classification of tumors of breast 2012 were studied [4]. Specimens were routinely processed and stained with Hematoxylin and eosin.

AIMS and Objectives

To study the Clinicopathological and Immunohistochemical features of Mucinous Carcinoma Breast.

Results

In the present study, we identified 25 patients 24 female and 01 male patient with mixed and pure mucinous breast carcinoma. The patient age ranged from 30 to 78 years with mean age at presentation was 58.3 years. All the patients had a palpable mass in their breast. The laterality of the lesions was left-sided in 15 (60%) patients and right-sided in 10 (40%) patients. All 24 female patient underwent modified radical mastectomy (Table 1 & 2).

Table 1: Gender distribution of cases

	Pure MC	Mixed MC
Male	0	1 (4%)
Female	8 (32%)	16 (64%)
Total	25	

Table 2: Age distribution of cases

Age	No of cases	
	Pure MC	Mixed MC
10-19	-	-
20-29	-	-
30-39	2	4
40-49	2	-
50-59	1	6
60-69	3	5
70-79	-	2
TOTAL	08	17

The tumor size varied greatly from 2 to 11 cm in diameter (size was T1 in 5 patients, T2 in 9 patients, T3 in 11 patients. 15 patients had lymph node metastases. No distant metastases were identified. 7 cases were stage I, 10 were stage II and 8 were stage III (Table 3).

Table 3: Clinopathological Characteristics

	PURE MC (No of cases)	Mixed MC (No of cases)
T1 (<2 cm)	2	3
T2 (2-5 cm)	4	5
T3 (>5 cm)	2	9
T4 (Extension to chest wall / skin	-	-
Nodal status positive	3	8
pNo	6	4
pN1	1	6
pN2	1	5
pN3	-	2
Stage (TNM)		
I	3	4
II	2	8
III	3	5
IV	0	0

Immunohistochemistry with ER, PR and Her 2NEu was done in all cases of present study. Synaptophysin and

chromogranin were used in cases showing neuroendocrine differentiation for confirmation. (Table 4)

Table 4: Hormone receptor status of Mucinous carcinomas

	ER (No of cases)		PR (No of cases)		Her 2neu (No of cases)	
	Positive	Negative	Positive	Negative	Positive	Negative
Pure MC	3	5	4	4	5	3
Mixed MC	8	9	6	11	7	10

On gross examination, the majority of specimens were well circumscribed, bosselated and had a relatively soft consistency, on cut section showed mucoid material with

characteristic gelatinous and glistening appearance. There was no nipple or skin involvement in this study. (Figure 1)

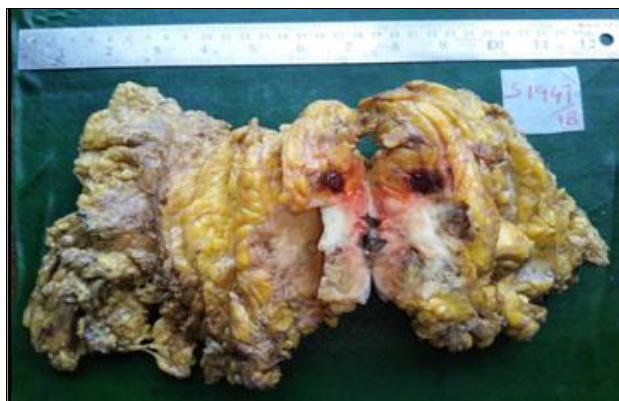


Fig 1: Gross Image (Picture showing grey white infiltrative tumor with focal mucinous areas.)

On microscopic examination we identified 17 cases of mixed type mucinous breast cancer accompanied by an intraductal or invasive component (ductal) noted generally at the periphery of the lesion. In situ component had a papillary, micropapillary or cribriform pattern. In some

cases, in situ carcinoma showed prominent extracellular mucin production. We also diagnosed 3 cases of “pure” mucinous breast carcinoma (hypocellular/ paucicellular variant - Figure 2).

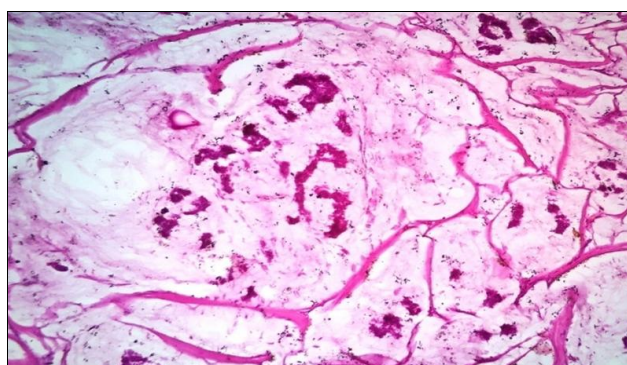


Fig 2: Small clusters of neoplastic cells floating in pools of mucin (Pure MC – hypocellular variant H&E 100X)

The microscopic features were small clusters or individual uniform epithelial cells with mild to moderate nuclear atypia, prominent nuclei, vesicular nucleoli and moderate amount of cytoplasm, floating in abundant pools of extracellular mucoïd material. Occasionally we observed that mucinous carcinomas may harbor bizarre cells with high nuclear grade. Delicate bands of fibrovascular connective tissue were often present within the mucus lakes.

The cell clusters floating in the mucus may be solid, micropapillary or form secondary lumina.

A subset of mixed mucinous carcinomas (4 cases) showed neuroendocrine differentiation defined by cytoplasmic argyrophilia or immunoreactivity to markers such as synaptophysin (Figure 3), synaptophysin and neuronal specific enolase.

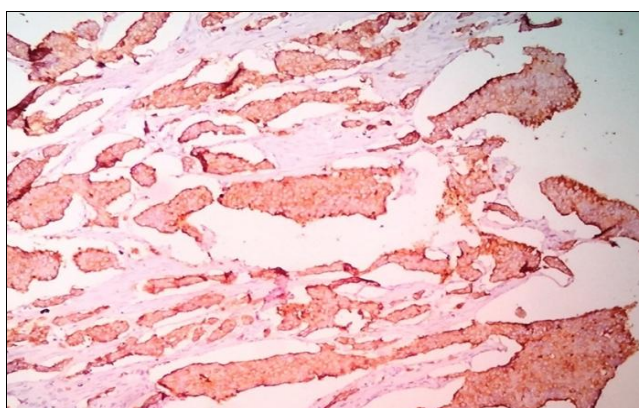


Fig 3: Tumor cells showing positivity for Synaptophysin positivity (IHC)

In 2 cases we noticed metastases in the axillary lymph nodes in pure Mucinous carcinoma and 13 cases showed secondary deposits in Mixed Mucinous carcinoma.

Discussion

The Clinicopathological features and hormone receptor status was studied in all the 25 cases of mucinous carcinoma

of present study.

In the present study mean age of pure mucinous carcinoma is 50.5 and mixed mucinous carcinoma is 56.5 which is in concordance with the studies of Erhan *et al.* [8] and Renade *et al.* [5]

The mean tumor size for pure mucinous carcinoma in our study is 4.75cm and for mixed is 3.1 cm, both which come under T2. This is in par with the tumor size of studies of Renade *et al.* [5] Erhan *et al.* [8] and lie lie *et al.* [6] all of which presented with T2. The lesser size at presentation of mucinous carcinoma and hence the stage is associated with good prognosis.

Pure mucinous carcinomas showed 33% lymph node positivity. Mixed mucinous carcinoma showed 50% positivity. Lymph node positivity is relatively higher in our study when compared to the studies of Ranade *et al.* and Kashiwagi *et al.* [7] which showed 18.5% for pure, 16% for mixed and 8.3% pure, 17.5% mixed respectively. Higher lymph node positivity in mixed type can be attributed to the presence of the second component like invasive ductal carcinoma.

ER PR positivity for pure type is 83% and Her2neu is 66% in the present study which is in par with the studies of Renade *et al.* and Bon pan *et al.* [9] Mixed type showed ER75%, PR 100% and Her2neu 50%. These values correlated with studies of Erhan *et al.* and Bon pan *et al.* Higher percentage positivity with hormone receptors is seen in our study which indicates good prognosis for mucinous carcinoma.

In our study to conclude majority of the cases presented at older age, lesser tumor size, and greater positivity for hormone receptor, all of which carry good prognosis.

Conclusion

Mucinous carcinoma of the breast is a rare entity with a favorable prognosis. In our study pure mucinous carcinoma accounted largest group and are seen at a younger age when compared to mixed mucinous carcinoma. Almost all the cases presented in stage p T2. Majority of the Pure MC did not show evidence of secondary deposit, whereas 50% cases of Mixed MC show secondary deposit. Most of cases of pure mucinous and mixed mucinous showed hormone receptor positivity. Older age at presentation, lesser tumor size and stage, hormonal receptor positivity are observed in our study, all of which are associated with good prognosis.

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